Appendix 1

Study protocol

Can stable, isolated Weber B -type fibula fracture be treated safely with only three weeks of immobilization instead of traditional cast immobilization for six weeks?

Title: Three- versus Six-week Immobilization for Stable Weber B-type Ankle Fractures: A randomised, multicenter, non-inferiority clinical trial

Registration: ClinicalTrials.gov at 12/2012 registration number NCT01758835.

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Roles and responsibilities

Study protocol is contributed by Kortekangas, Flinkkilä, Haapasalo, Nortunen, Laine and Pakarinen. Biostatistician Pasi Ohtonen contributed to statistical plan section.

Introduction

Background

Stable isolated fibular fractures account for approximately half of all ankle fractures, with an incidence that is growing.[1] On the basis of the current recommendations and the published literature, these fractures can be treated non-operatively with good outcomes.[6,8,17-19,25,28-31]

Traditionally, the non-operative treatment of a stable ankle fracture has been immobilisation in a below-the-knee plaster or fiberglass cast for approximately six weeks.[8,17-19,21] Clinical results are usually good, but prolonged cast immobilisation is associated with potential adverse effects, including a decreased range of motion and an increased risk for deep vein thrombosis (DVT).[25,26] To avoid these problems, a wide variety of functional non-operative ankle fracture treatment protocols have been introduced, ranging from the elastic bandage,[29,30] to ankle braces,[25,31] and high top shoes.[28]

Previous comparative studies have suggested that functional treatment could result in a better outcome than traditional cast immobilisation,[25,30] but we lack high quality evidence for this assertion. Thus far, only two randomised (one of which quasi-randomised [25]) clinical trials have compared cast and functional treatments, but with a follow-up limited from three to six months, and a relatively low patient number.[25,30] Further, previous studies have based their stability assessments on radiographic ankle fracture classification systems and clinical signs that are considered inadequate in terms of differentiating between stable and unstable injuries. [6,8,11-15] This assessment is considered to be crucial in terms of successfully treating an ankle fracture.[6,8,11-15] The lack of randomised, controlled trials, or high-quality prospective studies, together with a heterogeneity in the study design for the published material, provides an inadequate evidence base with which to reach decisions for the optimal non-operative treatment for the most common ankle fracture type, the isolated Weber B -type[4] fibula fracture.[1,6]

(*References numbered according to the Manuscript reference list*)

Aim

The aim of the trial is to determine whether treatment of stable Weber B-type ankle fractures with only 3-weeks in cast or even in a simple orthotic device, offers outcome non-inferior to traditional six-weeks of cast immobilization. The hypothesis is that a three-week immobilisation with either a removable orthosis, or below knee-cast, would yield comparable clinical results to the current standard treatment, which is with a below knee-cast for six weeks, with possible less harms.

Trial design

A randomised, parallel group, non-inferiority study, comparing three non-operative treatment methods for stable Weber B -type ankle fractures with allocation ratio 1:1:1. The rationale for non-inferiority design could be summarized as follows: less immobilisation may improve mobility and strength and may reduce DVT, but concern exists whether this is achieved with increased risk of widening of the ankle mortise and non-union as a consequence of shorter immobilisation. Hence, in addition to our primary outcome (functional score), our outcomes were geared on capturing the effects of the different treatment protocols on, restoring the ankle mortise, ROM of the injured ankle, rate of non-union and suspected DVT.

Methods: Participants, interventions, and outcomes

Study setting

Study is conducted at two University teaching hospitals (City of Oulu and Tampere) in Finland. Both these hospitals treat all the fracture patients within their catchment areas.

Eligibility criteria

All skeletally mature patients (16 years or older) visiting either emergency department of the two participating university teaching hospitals for an isolated (i.e. no other osseous injury) Weber B -type fibular fracture with reduced ankle mortise (figure 1) are assessed for study eligibility. Ankle mortise is defined as reduced when the medial clear space (MCS) < 4 mm and ≤ 1 mm wider than

the superior clear space at the mortise-view in standard non-weightbearing radiographs with ankle in neutral dorsiflexion.

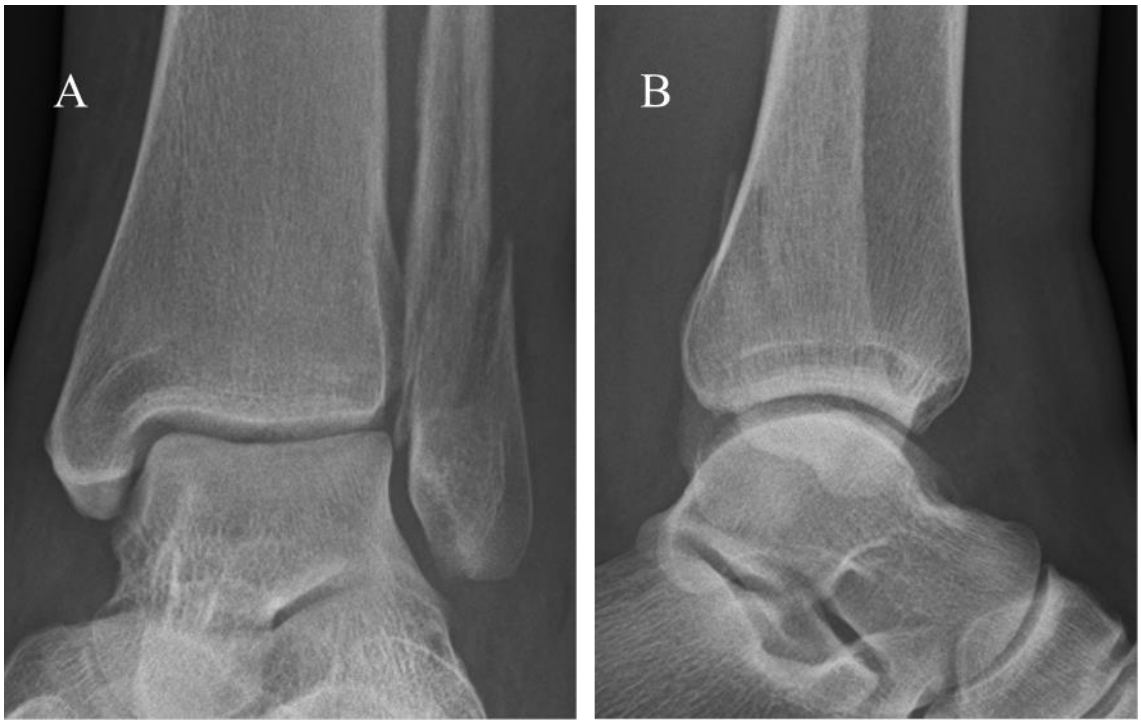


Figure S1. Weber B -type fibular fracture with reduced ankle mortise.

According to the standard hospital protocols and current recommendations[12-14], an external-rotation stress test (ER-stress test, figure S2 A&B) under fluoroscopy is performed for all unimalleolar ankle fracture patients with reduced ankle mortise in standard ankle radiographs, at the emergency department by the surgeon-on-call to assess stability of the ankle mortise. The fracture is considered stable when the medial clear space (MCS) is < 5 mm as measured between the lateral border of the medial malleolus and the medial border of the talus at the level of the talar dome (figure S2 C&D)[12-14]. The fluoroscopy radiographs are calibrated using a 30 mm disk, which is placed and fixed with tape to the skin of the patient ankle just above the upper ankle joint line. Measurements are made to an accuracy of 1 mm.

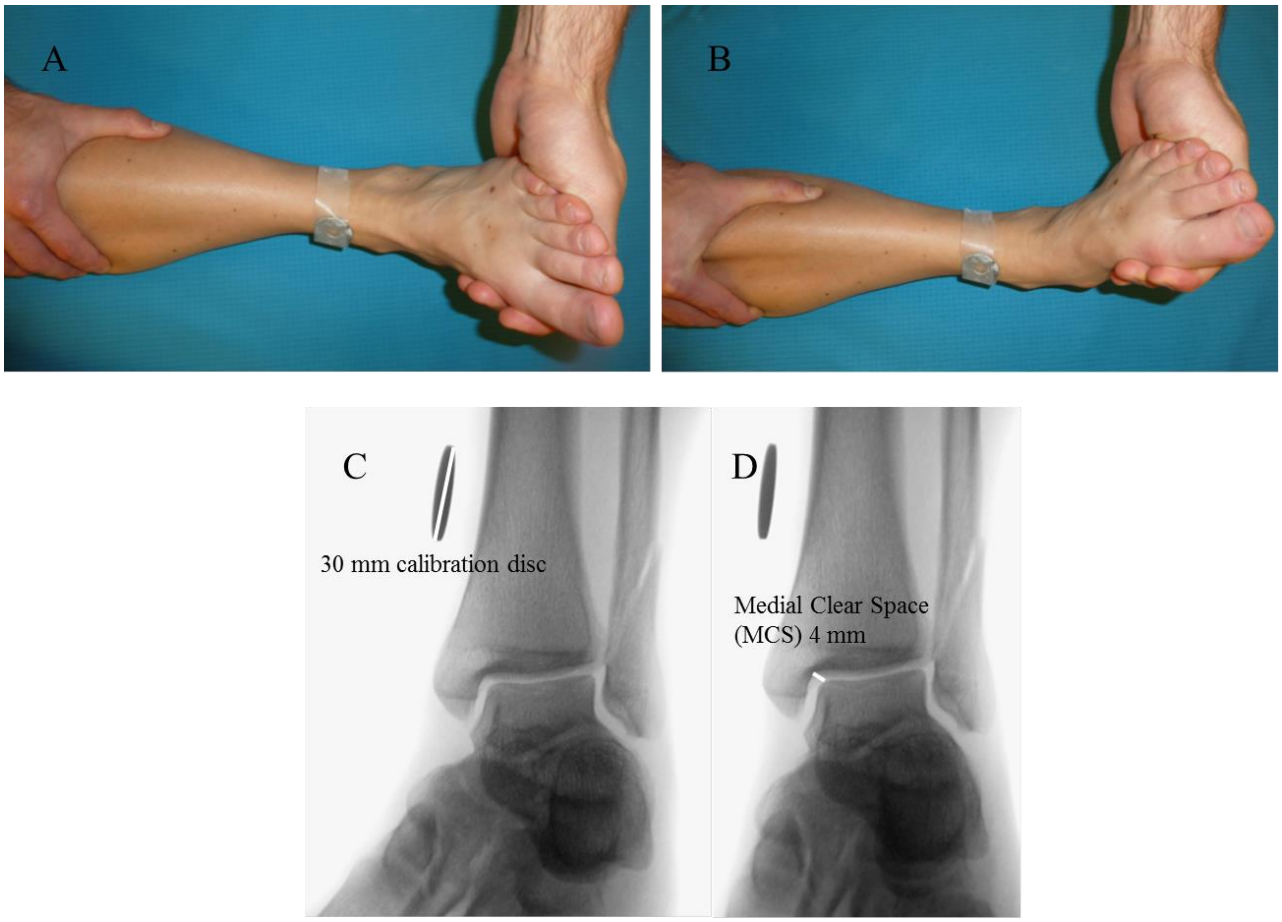


Figure S2. External rotation stress radiographs are taken at the emergency department by the surgeon-on-call. To obtain an approximation of the true mortise view, the leg is stabilised with an approximately 10° to 15° internal rotation, with the ankle in neutral dorsiflexion (A)[12-14]. A control fluoroscopy scan is taken to ensure correct positioning (C), with an external rotation force (approximately 8 to 10 lb / 3.6 to 4.5 kg)[12] then applied to the forefoot before repeating the scan (B and D). A 30 mm calibration disk is used to calibrate the radiographs (A), with measurements made to an accuracy of 1 mm. The fracture is considered to be stable when the medial clear space (MCS), measured between the lateral border of the medial malleolus and the medial border of the talus at the level of the talar dome, is < 5 mm (D)[12-14].

12. McConnell T, Creevy W, Tornetta P, 3rd. Stress examination of supination external rotation-type fibular fractures. *J Bone Joint Surg Am* 2004;86-A(10):2171-8.

13. Park SS, Kubiak EN, Egol KA, Kummer F, Koval KJ. Stress radiographs after ankle fracture: the effect of ankle position and deltoid ligament status on medial clear space measurements. *J Orthop Trauma* 2006;20(1):11-8.

14. Gill JB, Risko T, Raducan V, Grimes JS, Schutt RC, Jr. Comparison of manual and gravity stress radiographs for the evaluation of supination-external rotation fibular fractures. *J Bone Joint Surg Am* 2007;89(5):994-9.

Table 1. Inclusion and Exclusion Criteria

Inclusion criteria
1. Skeletally mature patients (16 years or older) men or women
2. Isolated Weber B -type fibula fracture and no widening of the ankle mortise on the static ankle radiographs Medial clear space < 4 mm and ≤ 1 mm wider than the superior clear space
3. Stable ankle mortise at the External-Rotation Stress test (ER-stress) Medial Clear Space (MCS) < 5 mm as measured between the lateral border of the medial malleolus and the medial border of the talus at the level of the talar dome
4. Patients able to walk unaided before the current trauma
5. The enrolment less than 7 days after the injury
6. Provision of informed consent from the participant
Exclusion criteria
1. Previous ankle fracture or deltoid ligament injury or other significant fracture in the ankle/foot area
2. Bilateral ankle fracture
3. Concomitant tibial fracture
4. Pathological fracture
5. Diabetic or other neuropathy
6. Inadequate co-operation Inability to speak, understand and read in the language of the clinical site (history of alcoholism, drug abuse, psychological or psychiatric problems that are likely to invalidate informed consent
7. Permanent residence outside the catchment area of the hospital
8. Patient declined to participate

Eligibility assessment and randomisation process

On-call surgeon at the emergency department of either study hospital assesses patient eligibility and performs stability assessment. In addition, on-call surgeon informs participants about the study (verbal and written information) and performs randomisation by opening a numbered envelope, in a numerical order (1 to 250), containing information about the treatment method.

Interventions

According to randomisation, a cast or orthotic device is applied by a trained plaster technician using the study standards. Supporting devices are fitted individually for each participant to ensure the correct fit and comfort. Cast or orthosis is applied during the visit at the emergency department at the study hospital after testing the stability of the fracture and eligibility assessment.

Orthosis treatment: Dynacast/Ortho-Glass AS (BSN medical INC., Rutherford College, USA) (figure S3) is applied according to the manufacturers' instructions, from the middle third of the tibia to the calcaneus (figure S4).

Figure S3. Dynacast/Ortho-Glass AS (BSN medical INC., Rutherford College, USA)

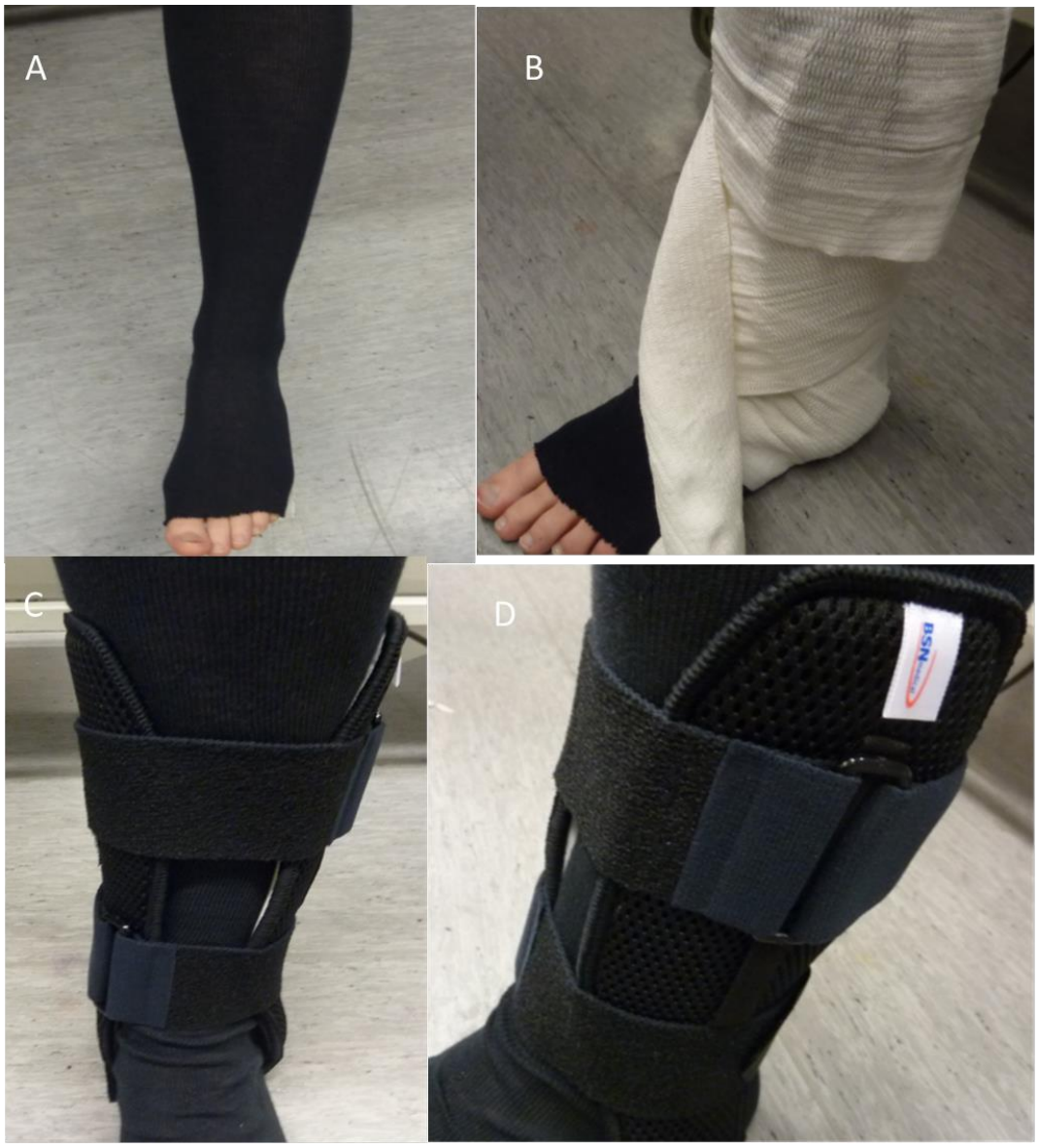
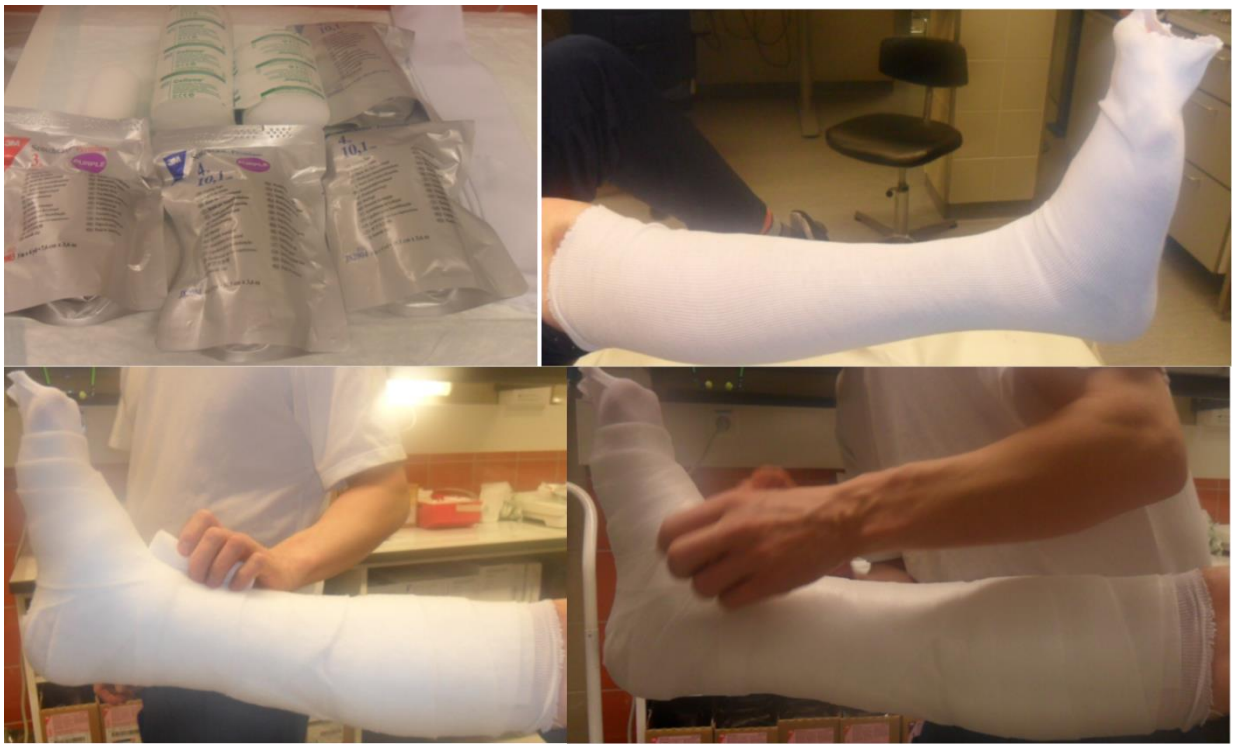
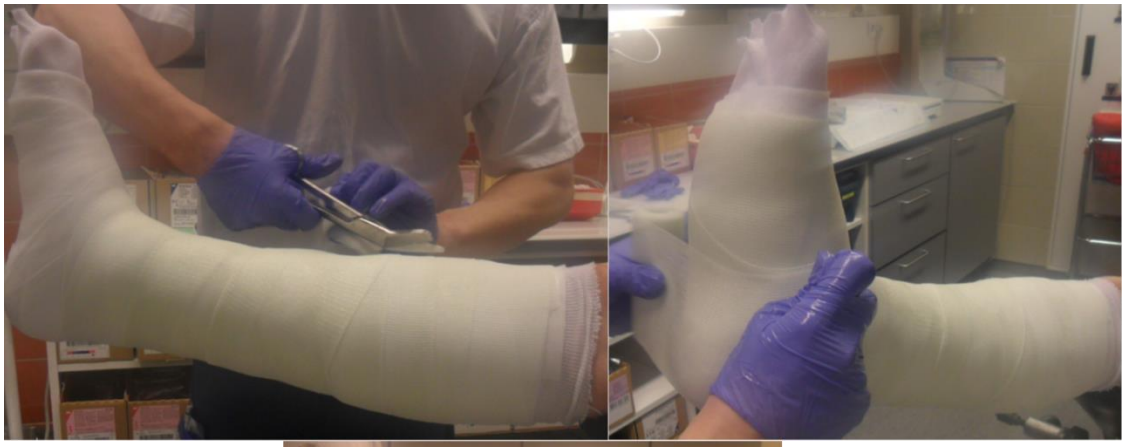
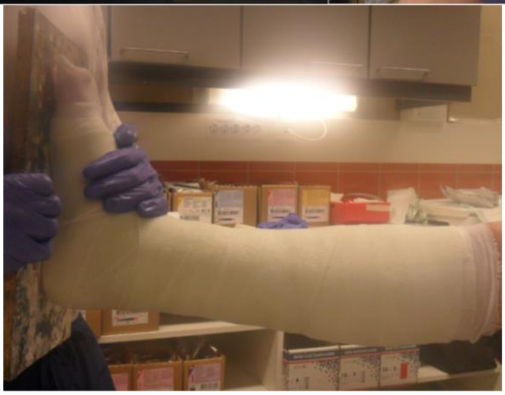


Figure S4. Protective sock is applied first (A). Secondly orthosis is applied and fitted without self-adhesive labels and bind with a damp elastic bandage (B). After 10 minutes, elastic bandage is taken off and orthosis is fixed with two self-adhesive labels (C&D).

Cast treatment (for 3- and 6-week cast groups): The below-knee cast is made from a synthetic non-flexible cast (3M Scotchcast St. Paul, USA) and is applied from the tuberosity of the tibia to the base of the toes, and is lined and padded. The cast is made ankle joint at 90 degrees angle (figure S5).







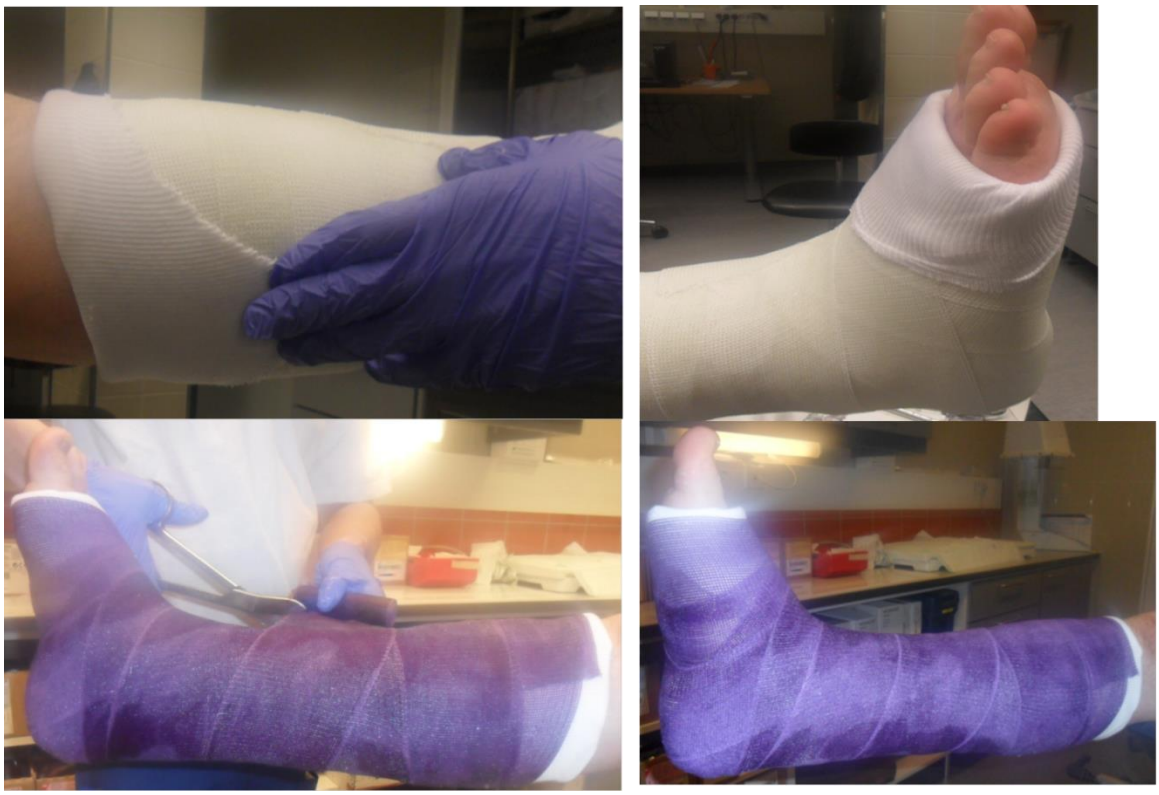


Figure S5. Cast is applied from the tuberosity of the tibia to the base of the toes, and is lined and padded. The cast is made ankle joint at 90 degrees angle.

Cast is reapplied at the same way at 3 weeks follow-up visit for patient in the 6 weeks cast treatment group. In case of difficulties with the cast fitting a new cast is applied by the study standards at the study hospital, if needed.

In case of participant at the 6-week cast group refuses to continue cast treatment at the 3-week control visit, surgeon conducting the follow-up visit discuss with the participant whether to continue the treatment for the following three weeks with orthosis or without any additional support. Before changing the treatment strategy the treating surgeon discusses with the participant. These patients are followed in accordance with intention-to-treat principle.

Walking with crutches is guided by a physiotherapist, with weight bearing permitted as tolerated from the time of cast or orthosis fitting for all patients.

Written and verbal instructions are provided to all participants as to how to manage with their ankle support, how to remove and reapply the support (for the orthosis group), and what to do in the event of difficulties. Patients are informed to contact orthopaedic outpatient clinic of the study hospitals

(Oulu or Tampere) if they have any questions or difficulties related to their injury or the treatment method.

The duration of initial sick leave is defined in accordance with the requirements of the patient work task by the surgeon-on-call who also conducts the stability assessment, assesses patient eligibility and informs participants about the study.

Risk factors for deep vein thrombosis (DVT) as well as need for DVT prophylaxis is evaluated independently. Routine DVT prophylaxis is not needed for patient treated with cast without any additional risk factors for DVT.

At every follow-up visits physiotherapist instructs rehabilitating exercises for the ankle. Patients are allowed to have additional visits at the private physiotherapist at their own expense.

Follow-up scheme:

Clinical follow-up visits are scheduled at three, six, 12 and 52 weeks from the time of injury. The follow-up visits are arranged at the orthopaedic outpatient clinic at the study hospitals. Radiographs of the injured ankle are taken at every follow-up visit. The participants subsequently complete questionnaires (independently) assessing ankle functional outcome, pain, and their quality of life, immediately prior to the follow-up visits at six, 12 and 52 weeks from randomisation. Ankle range-of-motion (ROM) is measured at six, 12 and 52 weeks.

Outcomes

The primary outcome measure:

The Olerud-Molander Ankle Score (OMAS) is a validated, condition-specific, outcome measure for ankle fracture. OMAS is a self-administered patient questionnaire. The scale is an ordinal rating scale from 0 points (totally impaired function) to 100 points (completely unimpaired function) and is based on nine different sections given different points: pain (0–25), stiffness (0–10), swelling (0–10), stair climbing (0–10), running (0–5), jumping (0–5), squatting (0–5), supports (0–10) and work/activity level (0–20). The score is calculated as the sum of each rated item.

The primary end point is the primary outcome measured at 52 weeks, as prespecified in the registered study protocol at ClinicalTrials.gov. Analyses of the primary outcome are also performed at 6 and 12 weeks, but these analyses are intended only to illustrate the trajectory of the treatment response.

Secondary outcome measures:

The Foot and Ankle Outcome Score (FAOS) is a self-administered patient questionnaire and consists of 42 items divided into five subscales: pain (9 items), other symptoms (7 items), function in daily living (ADL) (17 items), function in sport and recreation and foot (4 items) and ankle-related quality of life (5 items). Standardized options are given and for each item a five point. Likert scale is used (no, mild, moderate, severe, extreme). Each item gets a score from 0–4 and each of the five subscale scores is calculated as the sum of the rated items included. Raw scores are then transformed to a scale 0 (indicating extreme symptoms) to 100 (indicating no symptoms) (www.koos.nu). FAOS, developed from the self-reported questionnaire Knee Injury and Osteoarthritis Outcome Score (KOOS), has been found to be reliable over time in subjects with surgically treated ankle ligament injuries and valid against three subscales of SF-36 (bodily pain, physical functioning and social functioning) ($p < 0.01$) in subjects with different foot and ankle disorders.

A 100 mm Visual Analogue Scale (VAS, range 0-100mm, were a higher score indicates greater pain intensity and lower function) for measuring function and pain. The VAS is a simple and frequently used method for the assessment of variations in intensity of pain and also function. It is a measurement instrument for subjective characteristics or attitudes. When responding to a VAS item, respondents specify their level of agreement to a statement by indicating a position along a continuous line between two end-points.

RAND 36-item health survey (RAND 36) is conducted to assess health-related quality of life. RAND 36 questionnaire includes eight concepts: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. Scoring the RAND 36-Item Health Survey is a two-step process. First, precoded numeric values are recoded per the scoring key given. All items are scored so that a high score defines a more favorable health state. In addition, each item is scored on a 0 to 100 range so that the lowest and highest possible scores are set at 0 and 100, respectively. Scores represent the percentage of total possible score achieved. In step 2, items in the same scale are averaged together to create the 8 scale scores. The items

averaged together to create each scale. Items that are left blank (missing data) are not taken into account when calculating the scale scores. Hence, scale scores represent the average for all items in the scale that the respondent answered.

Mortise and lateral x-ray projections from the injured ankle are taken, to assess ankle joint congruity at every follow-up visits and fracture union at one year. The mortise view is done with the leg internally rotated 15-20 degree so that the x-ray beam is perpendicular to the inter-malleolar line. This view permits examination of the articular space (clear space). Ankle mortise is defined normal when (congruent) when medial clear space < 4 mm and ≤ 1 mm wider than the superior clear space at the mortise view. Fracture union is considered complete when the fracture line disappears and a visible fracture line is designated non-union.

ROM of the injured ankle is measured using a goniometer at the six, twelve-week, and one-year follow-up visits. Maximum dorsiflexion is measured with the patient standing (using the injured ankle) on a 30 cm high investigation table, and then asked to lean as far forward as possible, with his/her heel remaining on the table. Plantarflexion is measured with the patient sitting on an examination plane and then asked to plantar flex his/her injured ankle. The angle is then measured between the fifth metatarsal and fibula. Measurements are made to an accuracy of 5 degree.

Participant timeline table

Activity/Assessment	Staff member	Screening/ Enrolment (at the emergency department)	Visit 1 (3 week)	Visit 2 (6 week)	Visit 3 (12 week)	Visit 4 (52 week)
Mortise and lateral x-ray	Radiology	x	x	x	x	x
Checking inclusion and exclusion criteria	On-call surgeon	x				
Patient information (verbal and written)	On-call surgeon	x				
Randomisation	On-call surgeon	x				
Application of the ankle support according to randomisation (orthosis or cast)	Plaster technician	x	x (6 weeks cast group)			
Removing cast	Plaster technician		x	x (6 weeks cast group)		
Walking with crutches guidance	Physiotherapist	x				
Rehabilitation instructions	Physiotherapist	x	x	x	x	x
OMAS	Patient independently			x	x	x
FAOS	Patient independently			x	x	x
VAS pain and function	Patient independently			x	x	x
RAND 36	Patient independently			x	x	x
ROM	Outpatient clinic doctor			x	x	x
Ankle joint congruity (from mortise and lateral x-rays)	Outpatient clinic doctor		x	x	x	x
Radiological fracture union	Radiology					x

Sample size calculations

Sample size calculations are performed assuming a two-arm study (six-week cast vs. three-week cast or six-week cast vs. three-week orthotic device). The primary outcome measure is the OMAS one year after the trauma; this outcome measure is used for sample size calculations. Based on our previous study of stable ankle fractures treated non-operatively by Pakarinen et al. (FAI 2011), a mean Olerud-Molander Ankle Score of 88 with a SD of 20 is anticipated at the one-year follow-up. With α=0.05, power (1-β) = 0.8, a non-inferiority margin of 10% (=8.8 points), the estimated true difference between the novel treatments vs. traditional = 1.0 point in favour of the new treatments, and with a dropout rate of 20% results in 82 patients per group (total n=246).

Sample size calculating formula:

$$n_A = \frac{(r+1)\sigma^2(Z_{1-\alpha} + Z_{1-\beta})^2}{r((\mu_A - \mu_B) - d)^2}$$

Where

r=1, when equal n per group

σ^2 = estimated population variance

$(Z_{1-\alpha} + Z_{1-\beta})^2 = 7.9$, when α = 0.05 and β = 0.20 (power = 0.8)

μ_A = estimated true mean of treatment *A* (six-week cast)

μ_B = estimated true mean of treatment *B* (three-week orthosis or cast)

d = non-inferiority marginal

Non-inferiority margin

No estimate for minimal clinically relevant change (MCID) exists for the OMAS. Therefore, in the absence of better evidence on the appropriate non-inferiority margin, we organized a focus group discussion with experts in the field (Kortekangas T, Pakarinen H, Haapasalo H, Laine H-J, Flinkkilä T and Ohtonen P) to define the appropriate estimate for the non-inferiority margin. Based on our previous study of stable ankle fractures treated non-operatively by Pakarinen et al., a mean Olerud-Molander Ankle Score of 88 with a SD of 20 is anticipated at the one-year follow-up.[3] Our panel

reached a consensus that 10% difference in 0-100 scale would not be clinically significant, which we subsequently set as our non-inferiority margin (10% equals 8.8 points in the OMAS scale, Cohen's d = 0.215, indicating a small effect size). The non-inferiority margin was set only for the primary outcome and the primary end point (OMAS at 52 weeks). Secondary outcomes were assessed according to the CONSORT-statement for non-inferiority trials with a superiority hypothesis rather than a non-inferiority hypothesis, avoiding the need to set multiple non-inferiority margins when such margins are not available.[32]

3. Pakarinen HJ, Flinkkilä TE, Ohtonen PP, Ristiniemi JY. Stability criteria for nonoperative ankle fracture management. *Foot Ankle Int*. 2011;32(2):141-147.

32. Piaggio G, Elbourne DR, Pocock SJ, Evans SJ, Altman DG, CONSORT Group. Reporting of noninferiority and equivalence randomized trials: extension of the CONSORT 2010 statement. *JAMA*. 2012;308(24):2594-2604.

Recruitment

Study is conducted at the Oulu and Tampere University Hospitals which both treat all fracture patients within their catchment areas. It is estimated that annually 70-80 stable ankle fracture patient, suitable for non-operative treatment, are treated at the Oulu University hospital and respectively 150-160 patients at the Tampere University hospital. Recruitment is estimated to take two years. Recruitment results are monitored at every three months. Information exchange between the study hospitals are planned to take on a monthly basis. Recruitment is intensified if needed by keeping informational meetings for the staff (surgeons, nurses, physiotherapists, plaster technicians) of the study hospitals.

Methods: Assignment of interventions

Patients are randomly allocated to study groups according to a computer generated list, compiled by a biostatistician. (P.O). Randomisation is performed in blocks, where the block size varies randomly between six, nine, and twelve. A separate randomisation list is created for both centres. A research assistant (Tuula Rauma, not involved in patient care) seals the randomisation lists into numbered

(from 1 to 250), opaque envelopes, to ensure secrecy. After confirmation of patient eligibility and their willingness to participate in the study, the treating surgeon opens a numbered (in numerical order) envelope containing the method of treatment.

Besides the patients, only recruiting surgeons and two research assistants (both uninvolved in any further patient treatment), are aware of group assignment. The primary outcome assessor (T.K) and data analyst (P.O and T.K) are blinded as to group assignment. Group assignment is revealed at the time of the final data analysis. If there is uncertainty about the group assignment at the three weeks follow-up visit then the research assistant (Tuula Rauma at Oulu, Seija Rautiainen at Tampere) is consulted about it. If additional visits outside the study protocol are needed those are managed by "problem solvers" (H.P at Oulu and H-J.L at Tampere) and group assignment is revealed only if needed.

Methods: Data collection, management, and analysis

Baseline data (age, sex, level of education, type of trauma) are collected from electronical medical files when follow-up data is entered to SPSS file. Ankle joint medial side findings, pain at the ER-stress test (NRS) and medial clear space (MCS, mm) at the ER-stress test are recorded to screening form by surgeon-on-call during the screening progress at the emergency department.

Patients are invited to follow-up visits via postal mail. Patient are informed to contact nurse at the outpatient clinic by phone if the follow-up visit schedule is not appropriate and new follow-up visit is arranged. Research assistant contacts patient by phone or email if he/she does not arrive to organized follow-up visit and arranges new follow-up visit schedule in agreement with patient. If appropriate new follow-up visit cannot be arranged in agreement with the patient, then the patient is asked to return filled questionnaires. Patients are followed as on intention-to-treat basis.

At the follow-up visits patients return filled questionnaires which are then collected and recorded by outpatient clinic nurses and maintained at secure. Data is entered to protected files by research assistants. Treatment group (according to randomisation) is coded in numbers 1, 2 and 3 in random order. Data is double checked for errors by T.K at Oulu and H.H at Tampere. Randomisation is revealed after full data analysis is made.

Only the primary analyses assess non-inferiority. The null hypothesis is that the treatments are different by at least the given margin of clinical importance, and the alternative hypothesis is that the differences between treatments are within the non-inferiority margin, and hence three weeks immobilization (orthosis or cast) are noninferior to six weeks cast treatment.

According to CONSORT-statement for non-inferiority trials, secondary outcomes can be managed by a superiority. In this Trial, superiority hypothesis is planned to use when assessing secondary outcomes to avoid the need to set multiple non-inferiority margins when such margins are not available, and also to possibly show advantages of intervention (3-week cast or orthosis) treatment over the control (6-week cast) treatment. In addition, collecting and analysing the data of possible adverse effect/harms (DVT, decreased range of motion, skin problems, nerve compression) related to prolonged cast immobilization of the lower limb, is planned to show benefits of the interventions over the control treatment.

All statistical analyses are primarily conducted by intention-to-treat (ITT) basis. Secondary analysis is conducted by per-protocol, as a protection of risk to falsely claiming non-inferiority in case of protocol violations or cross-overs.[38] No covariance adjusted or subgroups analyses are planned. Summary statistics are presented as means with standard deviation (SD). Simple between group comparisons are performed using Student's t-test (continuous variables) and Fisher's exact test (categorical variables). When comparing repeatedly measured data between study groups, the linear mixed model (LMM) is utilized. The reported p-values for LMM are: p_{time}, for change over time; p_{group}, for the average between-group difference; and $p_{time\ x\ group}$, for the interaction between time and group. Two-tailed p- values are reported.

The statistical programs SPSS (IBM Corp. 2010 release. IBM SPSS Statistics for Windows, version 22.0. Armonk, NY: IBM Corp.) and SAS (version 9.3, SAS Institute Inc., Cary, NC, USA) are used for analyses.

Additional data monitoring committee is considered unnecessary since the study includes no safety issues and cause of VALVIRA (National Supervisory Authority for Welfare and Health) official supervising role in Finnish health care system.

Auditing of the trial conducting is planned to conduct monthly basis by T.K at Oulu and H.H at Tampere and information exchange is carried out via email or phone.

38. Jones B, Jarvis P, Lewis JA, Ebbutt AF. Trials to assess equivalence: the importance of rigorous methods. *BMJ* 1996;313(7048):36-39.

Ethics and dissemination

Study protocol (Finnish version) approval is retrieved form the institutional review boards of the Pohjois-Pohjanmaa (Oulu University Hospital) and Pirkanmaa Hospital District (Tampere University Hospital).

In case of need for protocol amendment, the whole study group assembles and discuss how to implement such changes to process.

Informed consent from eligibly patient for the study are obtained by surgeon-on-call who is also responsible for conducting screening process and giving patient information (verbal and written) at the emergency department visit.

Personal information is collected from electronical medical history database and stored to protected SPSS file. This information is kept secured and stored for five years after study ends.

Study group have no conflict of interest.

All members of the study group will have access to final trial dataset. No additional access to dataset is allowed. Randomisation group information is collected and secured by research assistants (Tuula Rauma at Oulu and Seija Rautiainen at Tampere)

Additional visits and examinations outside the study protocol are arranged if needed without any additional cost for the patient.

Reporting will follow the guidelines of the CONSORT statement for reports of a non-inferiority study with a parallel group, randomised design.[32] Study report is planned to publish in general medicine journal. In addition, study results are planned to represent in national and international conferences after publication.

32. Piaggio G, Elbourne DR, Pocock SJ, Evans SJ, Altman DG, CONSORT Group. Reporting of noninferiority and equivalence randomized trials: extension of the CONSORT 2010 statement. *JAMA* 2012;308(24):2594-2604.

Study report is written by the study group and no outside professional writer is used. All authors are involved to study design or data collection, data interpretation and manuscript writing process.

Appendix

Patient informed consent (in Finnish)

NILKKAMURTUMATUTKIMUS 5. potilastiedote 13.5.2012

TUTKITTAVAN TIEDOTE JA SUOSTUMUSASIAKIRJA

Tutkimuksen tarkoitus

Teitä pyydetään osallistumaan vakaata ulkokehräsluun murtumaa koskevaan tutkimukseen, jossa verrataan perinteistä 6 viikon kipsihoitoa 3 viikon kipsihoitoon ja 3 viikon hoitoon nilkan liikkeen sallivalla ortoosilla (irrotettava nilkan liikkeen salliva, mutta sivusuunnassa nilkkaniveltä tukeva lasta). Oletuksena on, että 3 viikon kipsaus ja ortoosihoito ovat vähintään yhtä hyviä hoitoja, kuin perinteinen 6 viikon kipsaus. Tutkimuksen tavoitteena on siis selvittää, mikä on optimaalinen vakaan nilkkamurtuman konservatiivinen hoito.

Tutkimuksen taustaa

Nilkkamurtumien hoidossa käytettyjen erilaisten konservatiivisten hoitovaihtojen välisiä eroja ei ole selvitetty asianmukaisesti tehdyllä satunnaistetulla tutkimuksella. Tavallisimmin hoito on toteutettu kipsisaappaalla nilkka tuettuna 90 asteen kulmaan. Suositeltu kipsausaika vaihtelee 4-6 viikon välillä. Murtuman ollessa luonteeltaan vakaa voidaan olettaa, ettei murtuman asento tule lujittumisen ja luutumisen aikana huononemaan ilman uutta tapaturmaa. Konservatiivista hoitoa onkin toteutettu menestyksellisesti myös toiminnallisella tuella tai jopa joustavalla sidoksella. Varauksen osalta on useimmiten noudatettu täysipainovarausta kivun mukaan. On olemassa useita tutkimuksia, joissa on verrattu kipsihoitoa ja ortoosia leikattujen nilkkamurtumien jälkihoitona. Erot toiminnallisissa tuloksissa ovat olleet vähäiset. Nilkkamurtuma on hyvin yleinen vamma, joten kipsihoidon lyhentämisellä on yksilön edun lisäksi myös yhteiskunnallista merkitystä.

Tutkimuksen kulku

Tutkimukseen otetaan ne vapaaehtoiset potilaat, joilla on tuore eli korkeintaan viikon vanha ylemmän nilkkanivelen tasolta alkava vakaa ulkokehräsluun murtuma. Murtuman vakaus eli stabiliteetti selvitetään dynaamisella röntgenkuvauksella, joka on jo standardimenetelmä sairaalassamme. Potilaan tulee olla iältään vähintään 16-vuotias. Potilaat arvotaan numeroidun, suljetun kirjekuoren perusteella kolmeen ryhmään: 3 viikon kipsihoito, 6 viikon kipsihoito ja enintään 3 viikon tuenta ortoosilla. Vammautunutta raajaa saa kuormittaa vapaasti kivun sallimissa rajoissa. Kliiniset kontrollit traumapoliklinikalla ovat 3 ja 6 viikon kohdalla, ja tutkimukseen liittyvät ylimääräiset kontrollit 12 viikkoa, 1 vuosi ja kaksi vuotta vammasta. Potilaan oireita ja toimintakykyä selvitetään oirekyselyillä 6 ja 12 viikon sekä 1 ja 2 vuoden kuluttua vammasta.
Ylimääräisiä röntgenkuvauksia nilkoista otetaan tutkimuksessa 8 kappaletta. Tämä vastaa alle viikon altistumista luonnon taustasäteilylle.

Tutkimukseen liittyvät hyödyt ja riskit

Tutkimukseen otetaan vain stabiiliksi luokiteltavia nilkkamurtumia, jotka soveltuvat kirjallisuuden ja kliinisen kokemuksen mukaan konservatiiviseen hoitoon. Potilas joutuu käymään ylimääräisissä kontrolleissa 12 viikon sekä 1 ja 2 vuoden kohdalla vammasta. Tutkimukseen osallistumisesta ei ole teille tutkimusasetelmasta aiheutuvia riskejä.

Luottamuksellisuus

Kaikki tiedot käsitellään ehdottoman luottamuksellisesti. Sairauskertomustekstit tai henkilötietonne eivät ole saatavilla hoitavan henkilökunnan tai tutkimusryhmän ulkopuolisille. Tutkimusaineistoa säilytetään noin kaksi vuotta, kunnes tutkimus on valmistunut. Tutkimusaineiston tietoja ei käytetä tämän tutkimuksen ulkopuolella.

Vapaaehtoisuus

Osallistuminen tähän tutkimukseen on täysin vapaaehtoista. Tutkimuksesta ei aiheudu Teille ylimääräisiä kustannuksia. Teillä on oikeus kieltäytyä tutkimukseen osallistumisesta ja myöhemmin halutessanne myös syytä ilmoittamatta peruttaa suostumuksenne. Kieltäytymisenne tai osallistumisenne peruuttaminen ei vaikuta mitenkään tarvitsemaanne hoitoon nyt tai tulevaisuudessakaan.

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SUOSTUMUS TIETEELLISEEN TUTKIMUKSEEN

Olen tutustunut nilkkamurtumatutkimuksen potilastiedotteeseen. Lisäksi olen saanut riittävän ja ymmärrettävän suullisen selostuksen tutkimukseen liittyvistä asioista. Olen saanut riittävästi aikaa kysymysten tekoon ja harkintaan. Ilmoitan suostuvani kyseessä olevaan tutkimukseen.

Oulussa /Tampereella ___.___.20___

Potilaan allekirjoitus

Nimen selvennys

osoite

sähköpostiosoite

puh.

Kirurgin allekirjoitus

Nimen selvennys

Suostumusasiakirjoja tehdään kaksi (2) kappaletta, toinen tutkittavalle ja toinen tutkijalle